

July 3-16, 1984

An Argus Specialist Publication

# ZX USER

No. 3



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ZX User is published fortnightly with Home Computing Weekly. Subscriptions and back issues: Infonet Ltd, 10-13 Times House, 179 Marlows, Hemel Hempstead, Herts HP1 1BB. 0442 48432. Trade distribution: Argus Press Sales and Distribution Ltd, 12-14 Paul Street, London EC2A 4JS. 01-247 8233. Printed by Alabaster Passmore & Sons Ltd, of London and Maidstone, Kent. Design and origination: MM Design, Circus House, 26 Little Portland Street, London W1N 5AF

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This is the third issue of ZX User, a regular treat for all you HCW regulars.

Welcome to an issue crammed with listings and reviews, to help you make the most of your Spectrum's facilities, and keep you up to date with all the releases for your machine.

We also want to hear from you —

tell us what you like and what you want to see more of. We welcome your contributions — this is your magazine — and we're interested in your programs.

So don't keep us in the dark — tell us exactly what you think. We always try our best to give you just what you want and we want to hear whether you think we're right.

## You can get into print

WE WELCOME programs and articles from our readers. If you feel that your work meets our standards, please submit it to us for consideration for publication.

Programs must always be sent on cassette. Listings are helpful, but not necessary. Check carefully that they are bug-free. Include full details of what your program does, how it works, variables you have

used and hints on conversion. See the programs in this issue for guidance on what your paperwork should include.

Articles on using the Spectrum and the ZX81 should be no longer than 2,000 words. Those most likely to be published will help our readers make better use of their computers by giving useful advice, possibly with programming examples, tables and so on. Short hints are also welcome.

All submissions will be acknowledged and the copyright in such works which will pass to Argus Specialist Publications Ltd will be paid for at competitive rates.

Keep a copy of your work and include an SAE. Label everything clearly and give a daytime and home phone number if you can. All work for consideration should be sent to:

Paul Liptrot, ZX User, No. 1 Golden Square, London W1R 3AB

**ZX81 program .....page four**  
Pit your wits against your computer: go for the checkmate in this chess game

**Spectrum program .....page eight**  
Keep a record of your games scoring on your computer. Throw away those pens and paper!

**Spectrum program .....page ten**  
You'll need to be a mastermind to win this game. Logic and careful thought are essential. Can you beat your computer?

**Spectrum program .....page twelve**  
Inject new zap in your games: use these great sound effects to liven them up

**Spectrum program .....page fourteen**  
Here's something new. Throw your voice and control your Spectrum

**Spectrum reviews .....page sixteen**  
The pick of the bunch. All that's new for the Spectrum





# CHECKMATE

As a chess enthusiast, I decided that my scattered games listings needed organising, so that I could access them readily. I decided to use my trusty ZX81 to carry out the task (a computer for which my enthusiasm remains undiminished).

The initial design considerations were:

- Double board, with pieces moved on both boards simultaneously — so each player sees the board from his point of view.
- Auto-Replay, so that stored games can be replayed automatically (hands off), with a pause function to stop the action at any point.
- Listing of move notation to screen or printer.
- Games recorded automatically as play proceeds.
- Manual mode to allow games to be replayed one move at a time.
- Games up to 80 moves in length.
- A storage capacity of 30 games per C60 tape (120 games if you use QSAVE or a similar device).
- Standard international notation for moves.

The final program proved to be an extremely convenient way of both storing games and playing them. An additional feature which enthusiasts can add is a chess clock.

Enter the program listing.

*Use this handy program by Mike Biddell to store and play chess games on your ZX81. Your move next*

Note that the contents of the REM statements in lines 1 and 2 are irrelevant, as long as each contains at least 161 characters. Please also note that I have sinned and used O as a variable in lines 2330, 2335 and 2340, for which I apologise to the purists.

Now RUN the program and as a test piece, enter the game shown in Listing 2. Moves are entered as two digits followed by Return. For example, to move the king pawn key in

52 Return 54 Return.

When you have completed entry of the game use 0 Return to signify end of recording. The computer will now execute STOP and you can SAVE the game together with the program on to tape in the normal way.

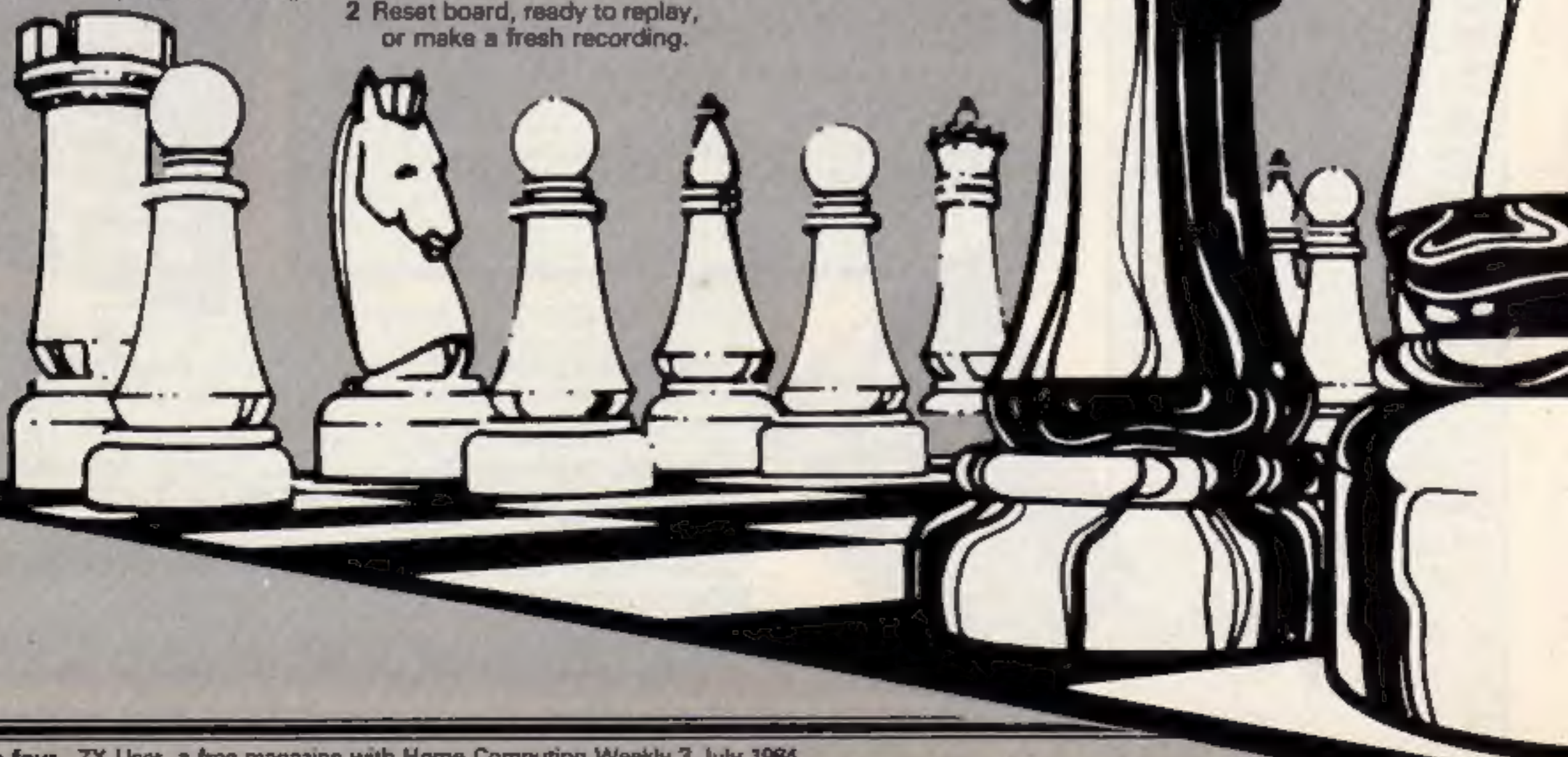
A summary of the operating features is presented below:

- 0 End of recording, used as described above.
- 1 Replay recording, one move at a time.
- 2 Reset board, ready to replay, or make a fresh recording.

3 Correct a move. If you make a mistake enter 3 Return, move the piece back where it came from, then enter 3 Return, followed by the correct move.

4 Castling or en-passant. These are considered to be two moves. For en-passant move your pawn on to the square occupied by your opponent's pawn, then enter 4 Return 4 Return (yes, twice), then move the pawn forward to its correct location. For castling move the king first, then enter 4 ENTER 4 ENTER followed by the rook move.

5 Copy position to printer. At interesting points during the game you can copy the positions on both boards to the printer, using 5 ENTER. The game can then continue as normal.





During Auto-Replay, holding down "P" will stop the game until you release.

You can save an adjourned game by not entering 0 ENTER when you finish. When you reload, put the program into the Auto-Replay mode and it will stop at the adjourned position, ready to continue.

**Variables**

- A\$ select listing
- B\$ select auto-replay
- S select board flag (S=0 left board, S=1 right board)
- E input move numbers (from?)
- B move numbers (dummy)
- F input move numbers (to?)
- C address in first REM for move number storage
- D address in second REM for move number storage

- Z move number count
- X flag for position of move indicator
- G,H,P,R compute screen address for POKEs
- Q screen address (from?)
- O screen address (to?)
- V code for piece to be moved
- X\$ select copy

**How it works**

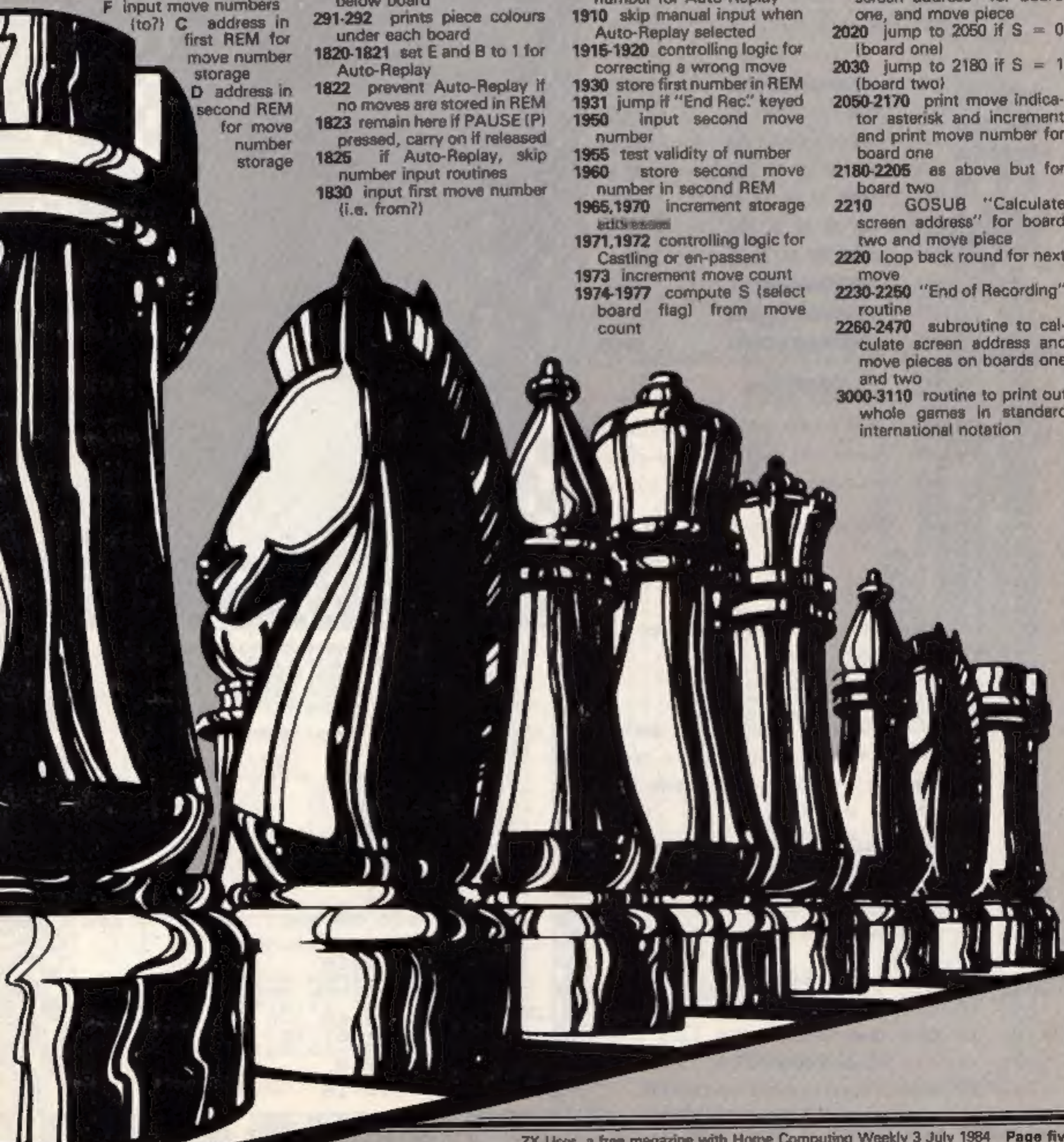
- 1,2 REMs to store all moves
- 3-10 select LISTING or AUTO-REPLAY
- 18-190 print board and pieces
- 210-260 initialise variables (260 sets W to first address in screen display)
- 270 POKEs move indicator below board
- 291-292 prints piece colours under each board
- 1820-1821 set E and B to 1 for Auto-Replay
- 1822 prevent Auto-Replay if no moves are stored in REM
- 1823 remain here if PAUSE (P) pressed, carry on if released
- 1825 if Auto-Replay, skip number input routines
- 1830 input first move number (i.e. from?)

- 1831 blank out old move numbers
- 1832 print move number to ?
- 1835 check valid input, loop back if not
- 1836-1837 copy screen if 5 pressed, then loop back
- 1840-1850 controlling logic for correcting a mistake in a move
- 1860 set up dummy variable B
- 1870 reset board if B = 2
- 1880 replay recording, peek REM for move number
- 1881-1882 controlling logic en-passant or Castling
- 1890 stop Auto-Replay if zero encountered in REM
- 1900 let F = second move number for Auto-Replay
- 1910 skip manual input when Auto-Replay selected
- 1915-1920 controlling logic for correcting a wrong move
- 1930 store first number in REM
- 1931 jump if "End Rec." keyed
- 1950 input second move number
- 1955 test validity of number
- 1960 store second move number in second REM
- 1965,1970 increment storage addresses
- 1971,1972 controlling logic for Castling or en-passant
- 1973 increment move count
- 1974-1977 compute S (select board flag) from move count



**Screen dump**

- 1980 GOSUB "Calculate screen address" for board one, and move piece
- 2020 jump to 2050 if S = 0 (board one)
- 2030 jump to 2180 if S = 1 (board two)
- 2050-2170 print move indicator asterisk and increment and print move number for board one
- 2180-2205 as above but for board two
- 2210 GOSUB "Calculate screen address" for board two and move piece
- 2220 loop back round for next move
- 2230-2250 "End of Recording" routine
- 2260-2470 subroutine to calculate screen address and move pieces on boards one and two
- 3000-3110 routine to print out whole games in standard international notation





# ZX81 PROGRAM

## Listing 1

```
1 REM 09?TE7Z)+03?XJ03N_??G.P
U_?DAX8GKZ?"?F>-75SDI?KOH6EN4 102
KOE?????PI?76?ZT?EZI?RS"J+S-6?S
```

```
2 REM 07ZS0GG(58PPIFHMH?_X158
G?_?ZSN7P IP IP IDK00*6HHH?2H6E:4
00OK:E6E??ZT?INKEY$INKEY$PI??Y?IZ
"?RSRNDJ+S-6E57J
```

```
3 CLS
4 PRINT "DO YOU WANT A LISTIN
G Y OR N?"
5 INPUT A$
6 IF A$="Y" THEN GOTO 3000
7 CLS
8 PRINT "AUTO REPLAY Y OR N?"
9 INPUT B$
10 CLS
11 PRINT "* TOLINKA *      * TO
LINKA *"
12 PRINT " 12345678      87
654321"
13 PRINT "
14 PRINT "
15 PRINT "
16 PRINT "
17 PRINT "
18 PRINT "
19 PRINT "
20 PRINT "
21 PRINT "
22 PRINT "
23 PRINT "
24 PRINT "
25 PRINT "
26 PRINT "
27 PRINT "
28 PRINT "
29 PRINT "
30 PRINT "0=RNBOBNR" 1=31
31 PRINT "
32 PRINT "
33 PRINT "
34 PRINT "
35 PRINT "
36 PRINT "
37 PRINT "
38 PRINT "
39 PRINT "
40 PRINT "7IIIIIIII" 2=31
41 PRINT "
42 PRINT "
43 PRINT "
44 PRINT "
45 PRINT "
46 PRINT "
47 PRINT "
48 PRINT "
49 PRINT "
50 PRINT "6■■■■■■■■" 3=■
51 PRINT "
52 PRINT "
53 PRINT "
54 PRINT "
55 PRINT "
56 PRINT "
57 PRINT "
58 PRINT "
59 PRINT "
60 PRINT "5■■■■■■■■" 4=■
61 PRINT "
62 PRINT "
63 PRINT "
64 PRINT "
65 PRINT "
66 PRINT "
67 PRINT "
68 PRINT "
69 PRINT "
70 PRINT "4■■■■■■■■" 5=■
71 PRINT "
72 PRINT "
73 PRINT "
74 PRINT "
75 PRINT "
76 PRINT "
77 PRINT "
78 PRINT "
79 PRINT "
80 PRINT "3■■■■■■■■" 6=■
81 PRINT "
82 PRINT "
83 PRINT "
84 PRINT "
85 PRINT "
86 PRINT "
87 PRINT "
88 PRINT "
89 PRINT "
90 PRINT "2■■■■■■■■" 7=II
91 PRINT "IIIIII"
92 PRINT "
93 PRINT "
94 PRINT "
95 PRINT "
96 PRINT "
97 PRINT "
98 PRINT "
99 PRINT "
100 PRINT "1■■■■■■■■" 8=RN
101 PRINT "BK0BNR"
102 PRINT "
103 PRINT "
104 PRINT "
105 PRINT "
106 PRINT "
107 PRINT "
108 PRINT "
109 PRINT "
110 PRINT "
111 PRINT "
112 PRINT "
113 PRINT "
114 PRINT "
115 PRINT "
116 PRINT "
117 PRINT "
118 PRINT "
119 PRINT "
120 PRINT "
121 PRINT "
122 PRINT "
123 PRINT "
124 PRINT "
125 PRINT "0=END REC. 1=REPLAY
REC."
126 PRINT "2=RESET BOARD 3=CORR
ECT MOVE"
127 PRINT "4=CASTLING OR EN-PAS
SENT"
128 PRINT "5=COPY POSITION TO P
RINTER"
129 PRINT "
130 PRINT "
131 PRINT "
132 PRINT "
133 PRINT "
134 PRINT "
135 PRINT "
136 PRINT "
137 PRINT "
138 PRINT "
139 PRINT "
140 PRINT "
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192 PRINT "
193 PRINT "
194 PRINT "
195 PRINT "
196 PRINT "
197 PRINT "
198 PRINT "
199 PRINT "
200 PRINT "
201 PRINT "
202 PRINT "
203 PRINT "
204 PRINT "
205 PRINT "
206 PRINT "
207 PRINT "
208 PRINT "
209 PRINT "
210 LET S=0
211 LET E=0
212 LET C=16514
213 LET D=16694
214 LET Z=1
215 LET U=PEEK 16398+256*PEEK 1
6397
216 POKE U+367,151
217 PRINT AT 12,8;"WHITE"
218 PRINT AT 12,22;"BLACK"
1820 IF B$="Y" THEN LET E=1
1821 IF B$="Y" THEN LET B=1
1822 IF PEEK C=128 THEN LET B$="
N"
1823 IF INKEY$="P" THEN GOTO 182
3
1825 IF B$="Y" THEN GOTO 1830
1830 INPUT E
1831 PRINT AT 21,0;"
1832 PRINT AT 21,0;E;" TO ";
1835 IF E>5 AND E<11 OR E>88 THE
N GOTO 1830
1836 IF E=5 THEN COPY
1837 IF E=5 THEN GOTO 1830
1840 IF E=3 AND S=0 THEN LET U=U
-16
1850 IF E=3 AND S=1 THEN LET U=U
+16
1860 LET B=E
1870 IF B=2 THEN GOTO 1
1880 IF B=1 THEN LET E=PEEK C
1881 IF E=4 AND S=0 THEN LET U=U
-16
1882 IF E=4 AND S=1 THEN LET U=U
+16
1890 IF B=1 AND PEEK C=0 THEN GO
TO 2230
1900 IF B=1 THEN LET F=PEEK D
```

```
1910 IF B=1 THEN GOTO 1965
1915 IF B=3 THEN LET Z=Z-1
1916 IF B=3 THEN LET C=C-1
1917 IF B=3 THEN LET D=D-1
1920 IF B=3 THEN GOTO 1830
1930 POKE C,E
1931 IF E=0 THEN GOTO 2480
1950 INPUT F
1951 PRINT F
1955 IF F>4 AND F<11 OR F>88 THE
N GOTO 1950
1960 POKE D,F
1965 LET C=C+1
1970 LET D=D+1
1971 IF E=4 THEN LET Z=Z-1
1972 IF E=4 THEN GOTO 1820
1973 LET Z=Z+1
1974 LET S=Z
1975 LET S=S-2
1976 IF S=0 OR S=1 THEN GOTO 198
0
1977 GOTO 1975
1980 GOSUB 2250
2020 IF S=0 THEN GOTO 2050
2030 IF S=1 THEN GOTO 2180
2050 PRINT AT 11,3;"■■■"
2060 LET U=U+16
2070 POKE U+367,151
2087 PRINT AT 12,3;INT (Z/2)
2170 GOTO 2210
2180 PRINT AT 11,19;"■■■"
2190 LET U=U-16
```



```

2385 IF X=0 AND S=1 THEN GOTO 24
2390
2398 GOTO 2360
2400 POKE 0,0
2410 GOTO 2430
2420 POKE 0,0
2430 LET G=9-G
2440 LET H=9-H
2450 LET P=9-P
2460 LET R=9-R
2470 RETURN
2480 STOP
3000 CLS
3005 LET C=16514
3006 LET D=16694
3010 PRINT "          "
3020 PRINT
3030 PRINT "          WHITE          B
LACK"
3040 FOR J=1 TO 100
3045 IF PEEK C=0 OR PEEK D=0 THE
N GOTO 3095
3046 IF PEEK C=4 THEN LET C=C+2
3047 IF PEEK D=4 THEN LET D=D+2
3050 PRINT J; ". ";PEEK C;" TO ";
PEEK D;
3060 LET C=C+1
3070 LET D=D+1
3071 IF PEEK C=0 OR PEEK D=0 THE
N GOTO 3095
3072 IF PEEK C=4 THEN LET C=C+2
3073 IF PEEK D=4 THEN LET D=D+2
3080 PRINT TAB 10;J;" . ";PEEK C;
" TO ";PEEK D
3081 LET C=C+1
3082 LET D=D+1
3090 NEXT J
3095 PRINT
3096 PRINT "          "
3097 PRINT
3098 PRINT "PRESS C NEWLINE TO C
ONTINUE"
3099 INPUT X$
3100 IF X$="C" THEN COPY
3101 IF X$="C" THEN GOTO 7
3110 GOTO 3099
    
```

```

22200 POKE U+367,151
22205 PRINT AT 12,19;INT (Z-1)/2
22210 GOSUB 2310
22220 GOTO 1820
22230 PRINT AT 20,0;"END OF RECOR
DING"
22240 PRINT "PRESS 2 TO RESET BO
ARD"
22250 GOTO 1830
22260 LET H=0
22270 LET G=INT (E/10)
22280 LET H=INT (E-10*G)
22290 LET P=INT (F/10)
22300 LET R=INT (F-10*P)
2310 IF S=1 THEN LET O=U+109+33+
(H-1)-(G-1)
2315 IF S=0 THEN LET O=U+332-33+
(H-1)+G
2320 LET V=PEEK O
2330 IF S=1 THEN LET O=U+109+33+
(R-1)-(P-1)
2335 IF S=0 THEN LET O=U+332-33+
(R-1)+P
2340 POKE O,U
2350 LET X=G+H
2360 LET X=X-2
2370 IF X=1 AND S=0 THEN GOTO 24
2375 IF X=0 AND S=0 THEN GOTO 24
2380 IF X=1 AND S=1 THEN GOTO 24
2385
    
```

Listing 2

WHITE		BLACK	
1.	52 TO 54	1.	37 TO 35
2.	71 TO 63	2.	57 TO 56
3.	42 TO 44	3.	35 TO 44
4.	63 TO 44	4.	17 TO 15
5.	21 TO 33	5.	28 TO 36
6.	31 TO 53	6.	78 TO 55
7.	61 TO 43	7.	47 TO 45
8.	54 TO 45	8.	56 TO 45
9.	51 TO 71	9.	68 TO 46
10.	44 TO 36	10.	27 TO 36
11.	53 TO 44	11.	58 TO 78
12.	41 TO 63	12.	38 TO 56
13.	61 TO 61	13.	36 TO 35
14.	44 TO 66	14.	48 TO 66
15.	63 TO 66	15.	77 TO 66
16.	11 TO 41	16.	68 TO 46
17.	43 TO 52	17.	16 TO 28
18.	22 TO 23	18.	35 TO 34
19.	33 TO 45	19.	56 TO 45
20.	41 TO 45	20.	46 TO 62
21.	71 TO 62	21.	48 TO 45
22.	52 TO 34	22.	45 TO 42
23.	34 TO 16	23.	42 TO 32
24.	51 TO 52	24.	32 TO 52
25.	16 TO 52	25.	28 TO 48
26.	12 TO 14	26.	46 TO 42
27.	62 TO 34	27.	42 TO 12
28.	62 TO 73	28.	76 TO 68
29.	73 TO 63	29.	66 TO 57
30.	72 TO 74	30.	66 TO 65
31.	74 TO 65	31.	67 TO 65
32.	34 TO 78	32.	87 TO 66
33.	63 TO 73	33.	57 TO 46
34.	73 TO 63	34.	12 TO 11
35.	63 TO 72	35.	46 TO 55
36.	78 TO 56	36.	55 TO 64
37.	56 TO 47	37.	11 TO 21
38.	47 TO 56	38.	21 TO 22
39.	56 TO 34	39.	22 TO 12
40.	34 TO 56	40.	66 TO 65
41.	56 TO 47		

END OF GAME

PRESS C NEWLINE TO CONTINUE



This program provides a handy scoreboard for any game where a pencil and paper would normally be used to record scores.

When RUN the participants' names are requested. It may be most convenient to enter names in the order of play or how the players are seated. You don't have to key in the initial player first. When all names are entered, press 0 to escape the identification routine. If seven names are listed, escape is automatic.

The computer now requests entry of player 1's score. Enter the score which can be positive, negative or a calculation. For example, enter 5 or -10 or  $3 \times 9 - 22/2$ . All entries are acceptable in the range -9999 to 9999. If an input score becomes too long it is rejected and another score is requested. This would happen if pi were to be entered as 22/7.

The computer now asks if the entered number is correct. If the number shown in the

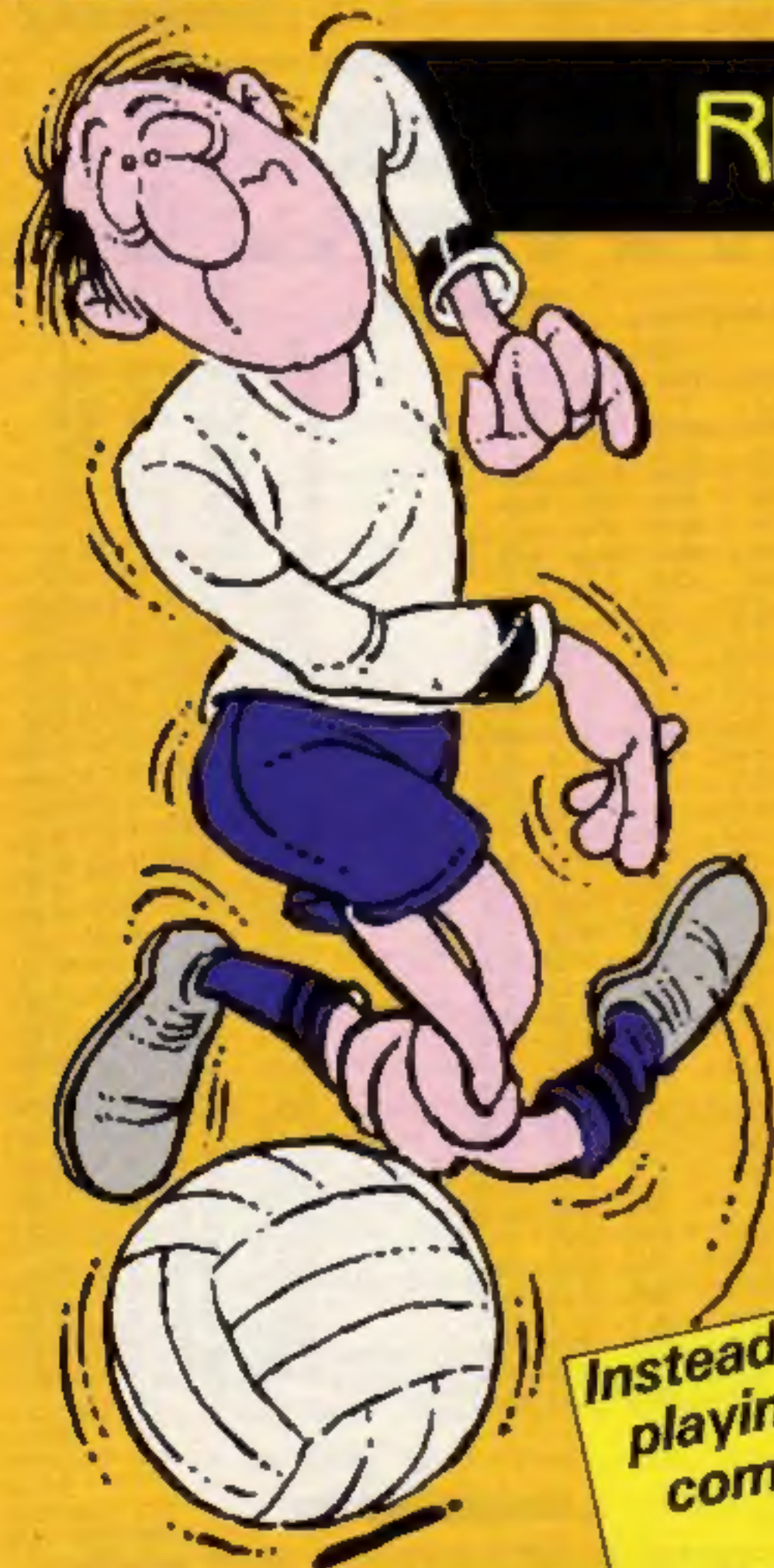
# Keep tabs on

## Listing for Scoreboard

```

10 REM ** SCOREBOARD **
20 REM ** D.B.HUGHES **
30 REM ** MAY10~1984 **
100 REM set variables
110 LET a=0: LET b=0: LET c=0: LET d=0: LET e=0: LET f=0: LET q=0
120 DIM n$(0,10)
150 GO SUB 9000: REM title
160 GO SUB 8000: REM start
190 REM player identification
200 FOR n=1 TO 7
210 PRINT AT 20,2: "PRESS '0' WHEN LIST COMPLETE"
220 INPUT "PLAYER ";n$(n)
230 IF n$(n,1)="0" THEN LET q=q+1: PRINT AT 20,2: FLASH 1: "      O.K."
      ": PAUSE 50: FLASH 0: GO TO 300
240 PRINT AT 4+n*2,1;n:":n$(n)
250 BEEP ,1,n*5
260 IF n>=7 THEN GO TO 280
270 NEXT n
280 LET q=n
290 REM score entry loop
300 FOR n=1 TO q
310 PRINT FLASH 1:AT 4+n*2,1;n:AT 4+n*2,3;n$(n)
320 PRINT AT 4+n*2,10: "

```



## REST of the WORLD 0

score box is correct then press Y,y or ENTER. If the number is wrong press N or n and enter the correct number. This facility guards against "finger trouble" when entering the scores.

When the current score is approved the player's total is updated and the next player's score is requested.

Now you're all set to have a computerised scoreboard. Don't cheat though — even if you're the only person in charge of scoring.

### Variable

a to g players' total scores  
s input score  
1 number of players programmed  
p vertical position of current player's score  
n\$ player's name  
g\$ input score verification

### How it works

100-160 set variables, dimension (DIM) name strings, call subroutines to format screen  
200-280 request and enter players' names (n\$)  
290-460 request and verify players scores in sequence  
500-570 update each player's total score  
8000-3200 end of round subroutine  
9000-9200 title and frame subroutine

### Conversion hints

DIM n\$(x,y) sets up x arrays to a maximum length of y characters. STR\$(x) converts a number, x, into string form, e.g. if x = 50 then STR\$(x) = "50". LEN gives the length of a string, e.g. LEN "50" = 2. BRIGHT and FLASH attributes are set to on with 1

Instead of laboriously writing out scores when playing games, why not input them on your computer? This program by David Hughes shows you how



# high scores



```

330 PRINT AT 20,1;" ENTER PLAYER ";n1;" SCORE "
340 INPUT s1: IF s1>9999 OR s1<=-9999 THEN GO TO 340
345 IF LEN STR$(s1)>6 THEN PRINT AT 20,1;"SORRY, THAT NUMBER IS
TOO LONG"; FOR z=10 TO -30 STEP -5: BEEP .1,z: NEXT z: GO TO 330
350 PRINT AT 4+n*2,16;s
360 INPUT "IS ENTRY CORRECT ? (Y/N) ";q$
370 IF q$="n" OR q$="N" THEN PRINT AT 4+n*2,16;" "": GO TO 340
380 IF s1<65 AND s1>-40 THEN BEEP .1,s
390 IF s1>65 AND s1<650 THEN BEEP .1,s/10
400 IF s1>650 THEN BEEP .1,65
410 IF s1<-40 THEN BEEP .1,-40
420 PRINT FLASH 0;AT 4+n*2,1;n;AT 4+n*2,3;n$(n)
430 LET p=4+n*2
440 GO SUB 500+n*10: REM total
450 NEXT n
460 GO SUB 8000: GO TO 300
500 REM update all players'
total scores
510 LET a=a+s1: PRINT AT p,25;" "": PRINT AT p,25;a: RETURN
520 LET b=b+s1: PRINT AT p,25;" "": PRINT AT p,25;b: RETURN
530 LET c=c+s1: PRINT AT p,25;" "": PRINT AT p,25;c: RETURN
540 LET d=d+s1: PRINT AT p,25;" "": PRINT AT p,25;d: RETURN
550 LET e=e+s1: PRINT AT p,25;" "": PRINT AT p,25;e: RETURN
    
```

## ENGLAND 26

Half Time

```

560 LET f=f+s1: PRINT AT p,25;" "": PRINT AT p,25;f: RETURN
570 LET g=g+s1: PRINT AT p,25;" "": PRINT AT p,25;g: RETURN
8000 REM end of round routine
8005 INK 1: PAPER 7: BRIGHT 1
8010 FOR n=3 TO 20
8020 PRINT AT 1,n1;" "": NEXT n
8030 PRINT AT 1,29;" "":AT 2,29;" "":AT 3,29;" "
8040 FOR n=20 TO 3 STEP -1
8050 PRINT AT 3,n1;" "": NEXT n
8060 PRINT AT 3,2;" "":AT 2,2;" "":AT 1,2;" "
8070 FOR n=3 TO 20
8080 PRINT AT 1,n1;" "": NEXT n
8090 PRINT AT 1,29;" "":AT 2,29;" "":AT 3,29;" "
8100 FOR n=20 TO 3 STEP -1
8110 PRINT AT 3,n1;" "": NEXT n
8120 PRINT AT 3,2;" "":AT 2,2;" "":AT 1,2;" "
8150 INK 0: PAPER 7: BRIGHT 0
8200 RETURN
9000 REM title & frame
9010 PRINT INK 1: PAPER 7: BRIGHT 1;AT 2,3;" SCORE -- BOARD "
9100 PRINT AT 4,2;" PLAYER SCORE TOTAL "
9102 PLOT 1,1: DRAW 253,0: DRAW 0,173: DRAW -253,0: DRAW 0,-173
9104 PLOT 3,3: DRAW 249,0: DRAW 0,169: DRAW -249,0: DRAW 0,-169
9110 PLOT 106,144
9115 DRAW 0,-124
9120 PLOT 170,144
9125 DRAW 0,-124
9130 FOR n=1 TO 8
9140 PLOT 4,4+n*16
9150 DRAW 247,0
9160 NEXT n
9200 RETURN
    
```

and to off with 0. PRINT AT x,y; "z" prints a character z at a position x characters down and y characters across from the left of screen. PLOT x,y locates a pixel x

pixels from the left and pixels up. DRAW x,y draws a line from the last PLOT or DRAW statement position to a position x pixels from the left and y pixels up.





This game of logic can be so frustrating, but satisfying when you finally get it right.

What you have to do is guess the four coloured pegs which are in sequence out of your sight. You are told if you have guessed the right peg in the wrong hole and if you get the right peg in the right hole. However, it's not as simple as it sounds and takes a lot of thought and due consideration.

You have 10 attempts and there are six colours from which the pegs may be selected. And don't despair —

if you still haven't cracked it after 10 guesses, you'll be told the formula at the end.

Instructions are included in the program and you can choose whether to read them or not. If you want to convert this game, re-arrange the screen displays. Also check the many variables used for little loops.

So, get ready for some brainteasing fun. It's all in the process of elimination, so marshal your thought, and off you go!

**How it works**

- 1-10 sort out whether instructions are wanted, go to correct area if yes
- 11-50 set up and check that no colours appear twice in sequence
- 54-89 input guess and check for correct length, ask if you want to change sequence
- 90-120 print up your guess in the columns

200-240 check if your guess is correct and if you ran out of attempts. If not, have another go

500-1160 check for correct colour in wrong place or correct colour in correct place

1200-1310 print out the series of circles and dots in a random order

4000-4050 GOSUBs to check your solution against the correct one

5000-5510 set up series of circles and dots to represent your guess

5600-5830 print up of instructions

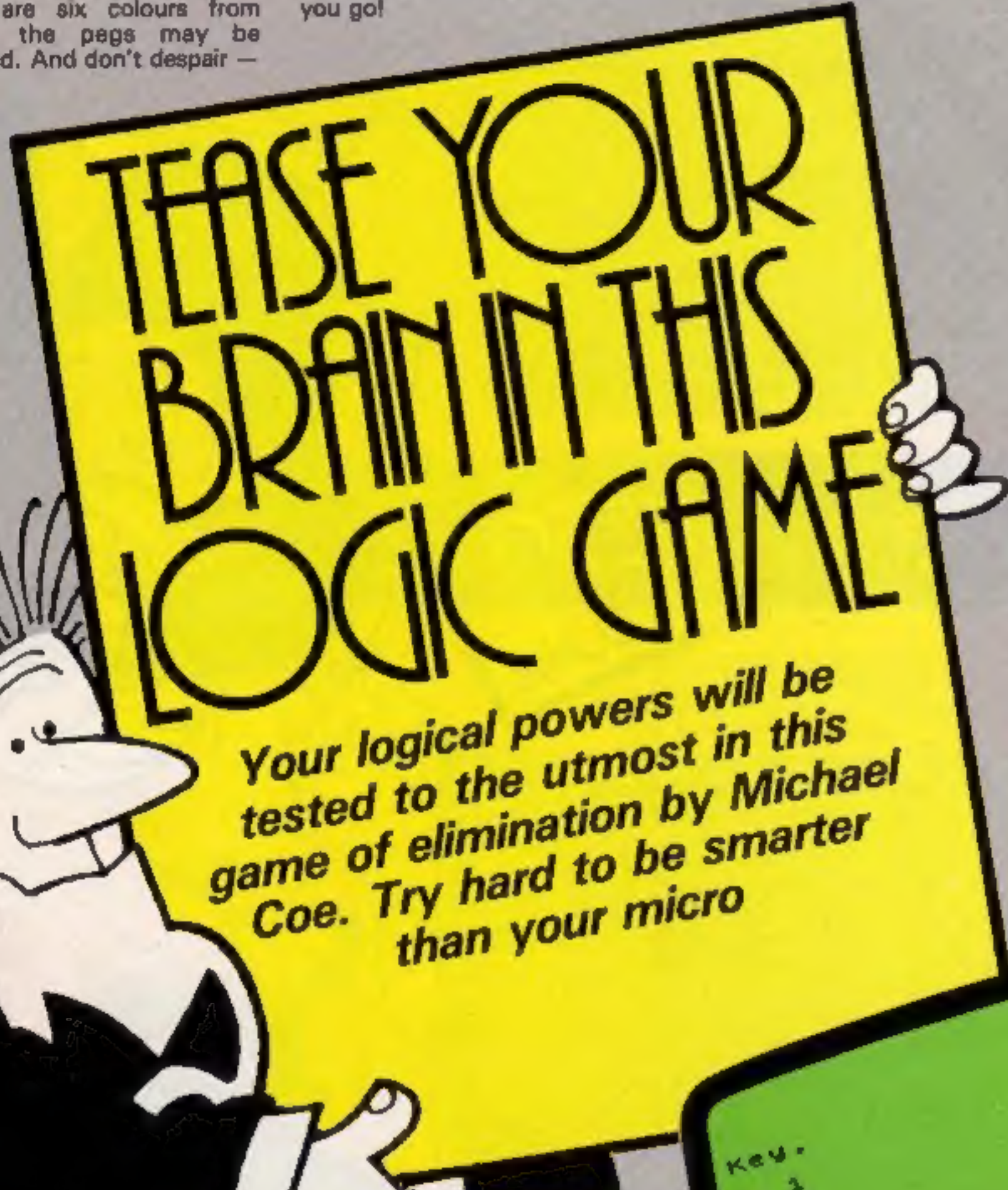
7000-7060 print up answer if you ran out of attempts

8000-8999 print up if you guess correctly

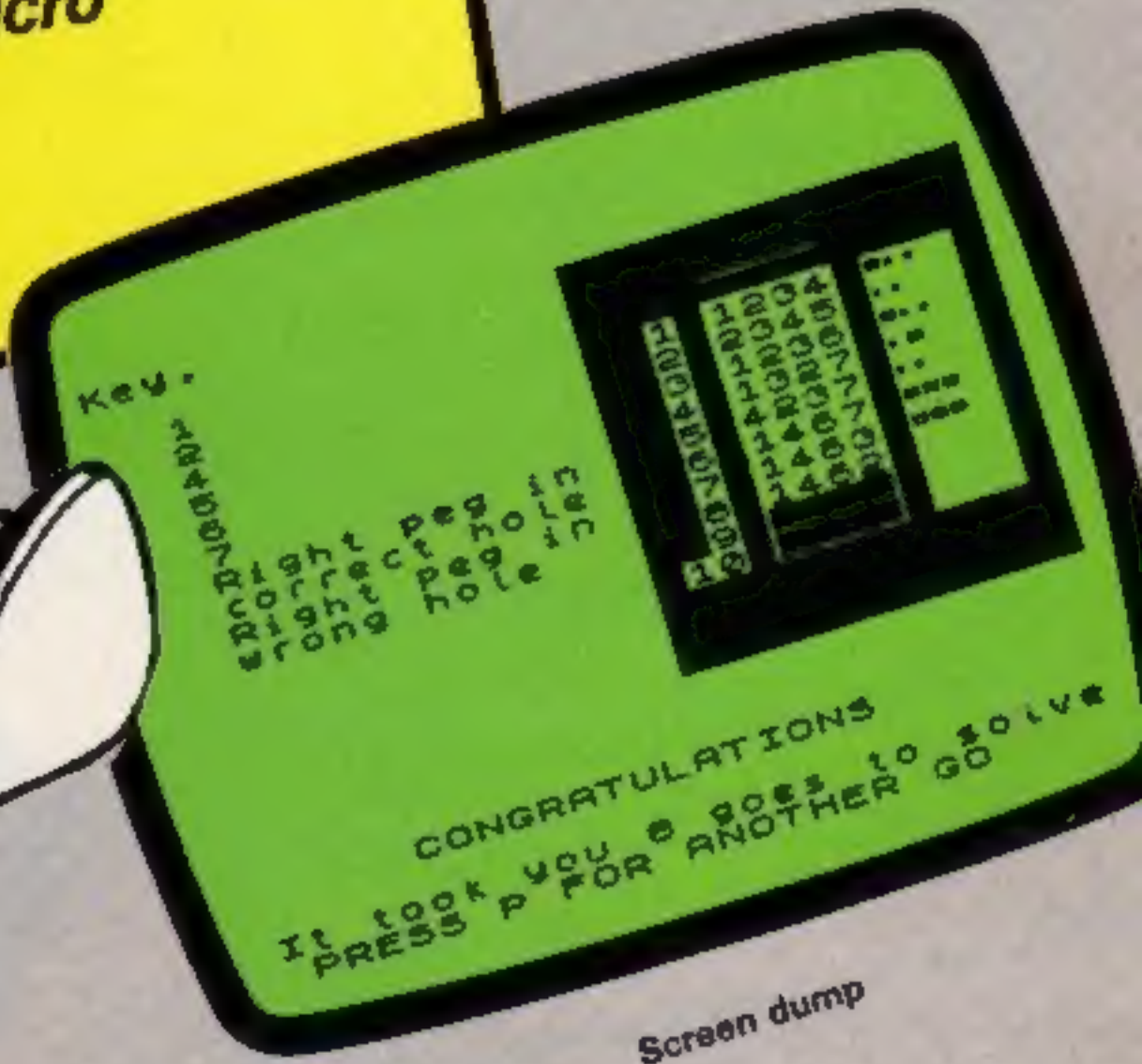
9000-9320 set up initial screen

**Variables**

- m number of attempts
- c answer colour generator
- a\$ hidden answer
- b\$ your guess
- l print your guess in sequence
- n part of b\$ to be checked against a\$
- o part of a\$ to be used to check b\$
- h sort out order to print dots and circles
- j,d,g. used to print out dots and circles
- p,q circle and dot co-ordinates
- e\$ sequence of dots and circles



Your logical powers will be tested to the utmost in this game of elimination by Michael Coe. Try hard to be smarter than your micro



Screen dump







Are you fed up with the slow reactions of games you write in BASIC? This utility program by Philip Carre helps you speed up those slow-moving missiles

# Inject new ZAP in your games!

So there you are sitting in front of your Spectrum. You've just typed in your latest masterpiece (completely debugged, of course). You press RUN and ENTER then sit back to watch the action.

The alien crawls across the top of the screen — not a good start. You press the key to move the laser base and sit there wondering how it can flicker so fast yet move so slowly. In desperation you jab a finger on the fire button and watch as the missile inches its way up the screen.

You've now got two choices, either you pull the plug and instead load in your latest games tape or you read the rest of this article.

Spectrum BASIC isn't very fast compared to some other computers, but if used efficiently you can still produce some exciting and reasonably fast games.

The first trap most people seem to fall into is using missiles. A missile is extremely slow because it has to advance one square at a time. It's far better to use a laser. Do this by using PLOT and DRAW, as Listing 1 shows. Press key 0 to fire.

If lasers don't fit into the context of your game and you really must use missiles then

you can speed them up by using a FOR...NEXT loop around the printing and detection routines. Study this example:

```
MAIN LOOP MOVE ALIEN
FOR a=1 to 3 PRINT MISSILE
SEE IF MISSILE HAS HIT ALIEN
NEXT a MOVE BASE GOTO MAINLOOP
```

Most people use

```
LET b = b + (INKEYS = "x"
and b < 28)-(INKEYS = "z"
AND b < 0)
```

to make the laser base move right and left. Another way of doing it is to use the IN function; enter it as line 70 in the above program.

```
70 LET b = b + (IN 65278 =
251 and b < 28)-(IN 65278 =
253 AND b < 0)
```

This is only slightly faster but with Spectrum BASIC every little bit helps. This is for key "z" to go left and key "x" to go right. If you want to alter the keys, refer to page 160 in the Spectrum manual; this gives you the addresses for each half row of the keyboard. As an exercise you could also change the fire routine in line 80 to use this method.

If your program features a lot of graphics all moving in unison, as in Space Invaders, then printing and erasing each one separately is very slow and tedious. The best way to do this is to put them in a string. Then you can use the Spectrum's string slicing facility to decrease the length of the string as each graphic is hit. This has the added bonus that as the string gets smaller there is less to print so the graphics appear to move faster.

Another problem is not being able to move and fire at the same time. Using the laser routine helps eliminate this, but it is still noticeable. The way to get round this is to intentionally stop the graphics, so that instead of moving smoothly across the screen and then stopping when you press the fire button, they are programmed to move and stop, move and stop, so that when you fire, although the action stops, you don't notice it.

If you synchronise the length of pause to the amount of time it takes to fire, it will give the illusion of being able to move and fire simultaneously.

Incorporating the above routines as well as the more

obvious ones, such as avoiding GOTOs and putting DEF FN statements at the beginning of programs, you should have a reasonably fast game.

If all this still doesn't satisfy you then you must look beyond BASIC. You could use a compiler to speed up your games a lot, but be warned: with most compilers, when you save your game on tape it also saves part of the compiler, which it needs to run the program. Although this doesn't matter for home use it's not very good if you have any dreams of selling your programs.

The final resort — and the best one — is to learn machine code. The second listing is a demonstration of the speed of machine code, and it can be incorporated into your own BASIC programs. The first part is a routine to clear a specified number of lines on screen, this is especially useful if you want to clear part of the screen display leaving the rest as it is. To achieve the same effect in BASIC you would either have to clear the whole

screen and then reprint the parts you need, or use a FOR...NEXT loop to clear each line one character at a time, which isn't very fast. This listing uses the Spectrum ROM and the effect is instantaneous.

The second DATA number in line 60 controls the number of lines to be cleared from the bottom up. The second part of the routine scrolls a specified number of lines up the screen. This can give a very good effect in BASIC program by moving one line or several lines of characters swiftly up the screen.

In this routine also, the second DATA number sets the number of lines to be scrolled up the screen, from the bottom up. Numbers in brackets are for 16K machines.

As you can see, these very powerful ROM routines may be accessed using very little machine code.

If you want to learn machine code, it's a lot easier if you use an assembler, because it calculates addresses and jumps for you. With an assembler and a good



## Listing 1

```

5 REM *** by Philip Carre ***
10 BORDER 2: PAPER 5: BRIGHT 1: CLS
20 FOR f=USR "B" TO (USR "E"+7): READ n: POKE f,n: NEXT f: REM graphic A and
B
30 BEEP .05,.05: RESTORE 120
50 LET a=18: LET b=15
60 PRINT AT a,b; INK 1;"  B  ": REM graphic A and B with 1 space before and af
t
er.
70 LET b=b+(IN 65278=251 AND b<28)-(IN 65278=253 AND b>0)
80 IF INKEY$="0" THEN GO SUB 100
90 GO TO 60
100 PLOT 8*b+15,(14-a)*8: DRAW INK 7;0,-(-127): FOR f=60 TO 64: BEEP .01,f: NE
XT f: PLOT OVER 1;8*b+15,(14-a)*8: DRAW OVER 1;0,-(-127): OVER 0
110 RETURN
120 DATA 1,3,134,134,254,134,130,3,0,128,194,194,254,194,130,128
130 REM * LINE 70 SHOULD BE REMOVED FROM THIS LISTING AND PRINTED SEPERATLY AS
IN THE ARTICLE.
140 REM * REMOVE THE LINE NUMBER FROM THE FOLLOWING LINE AND PRINT AS IN THE AR
TICLE.
150 LET b=b+(INKEY$="x" AND b<28)-(INKEY$="z" AND b>0)
160 REM * THE MACHINE CODE ROUTINES FOLLOW ON TAPE. JUST TYPE IN LOAD ""

```

## Listing 2

```

2 REM **CLEAR**
5 REM ***by Philip Carre***
10 LET b=65300: REM 32500 on 16K machine.
20 FOR a=0 TO 5
30 READ n: POKE b+a,n
40 NEXT a
50 DATA 6,10,205,68,14,201
60 RANDOMIZE USR 65300: REM (32500)
90 REM *****
102 REM **SCROLL**
105 REM ***by Philip Carre***
110 LET b=6300: REM (32500)
120 FOR a=0 TO 5
130 READ n: POKE b+a,n
140 NEXT a
150 DATA 6,12,205,0,14,201
160 RANDOMIZE USR 65300: REM (32500)
200 REM * IF YOU PUT THE FOLLOWING ROUTINE
AT LINE 1 IT WILL DEMONSTRATE THE RO
UTINES.
FOR f=0 TO 20: PRINT AT f,10:VAL
"f": NEXT f

```

beginners' book on Z80 programming (make sure it mentions the Spectrum in the title) you could find learning machine code a lot easier than you thought.

If the idea of learning machine code doesn't appeal to you, at least your BASIC programs will be a lot faster if you use the routines in this article.



As we progress in the eighties, fact continues to catch up with science fiction. A feature of many futuristic tales is the human communicating with a computer without using a keyboard. For a few years computers for the disabled have already been able to respond to sound, and now your spectrum will be able to do this too, using no extra hardware apart from a cassette recorder and a microphone.

It would be complex and unreliable to program the Spectrum to differentiate between sounds. Therefore these three programs simply "listen" for a sound and only have one control. You may think this would make things cumbersome, but that isn't necessarily the case.

To use the system one simple statement is needed. IN 31000 will scan the EAR port for sound (it will also scan some of the keys but this isn't relevant here). When you want your program to "listen" for a sound, type in a statement like

IF IN 31000 255 THEN...

When no sound is given 255 is the value. Changing the BORDER and PAPER colours sometimes affects most Spectrums, so this statement has been expanded to counteract the result of 191 being given, so:

IF IN 31000 255 AND NOT IN 31000 = 191 THEN ...

As most tape recorders have built-in microphones it is quite simple to speak to your Spectrum. Press Record and the pause button and connect the EAR socket to the computer. Now adjust the volume level: if the

screen are two boxes, one with Hi and other with Lo, and an arrow points to one of the boxes. This arrow swings between the two boxes; when it points to the box you want, speak. You begin the game with £100 and score £100 for each correct guess. You can win a bonus of £200 if you guess correctly four cards in a row. If your guess is wrong, the game restarts. You can break the bank if your luck holds.

There are other games possibilities for the voice-sensitive micro. A menu-driven adventure is possible but it would be slow, unless it was simple, in which case it would be boring.

It would be more interesting to use it as a fire command in arcade games. This would simplify games like Scramble, in which six keys are needed. Speech could be used to pick things up, in Atic Atac, for example. Alternatively you could use the speech facility in menu-driven games designers like Melbourne Houses HURG.

The program Quiz demonstrates a more serious side of speech control. Once RUN, it will start to ask you questions, displaying three possible answers. A flashing cursor will move slowly past each answer. When it passes the one you believe to be correct, speak. There are 10 simple general knowledge questions and it is simple to change the program by altering the DATA statements.

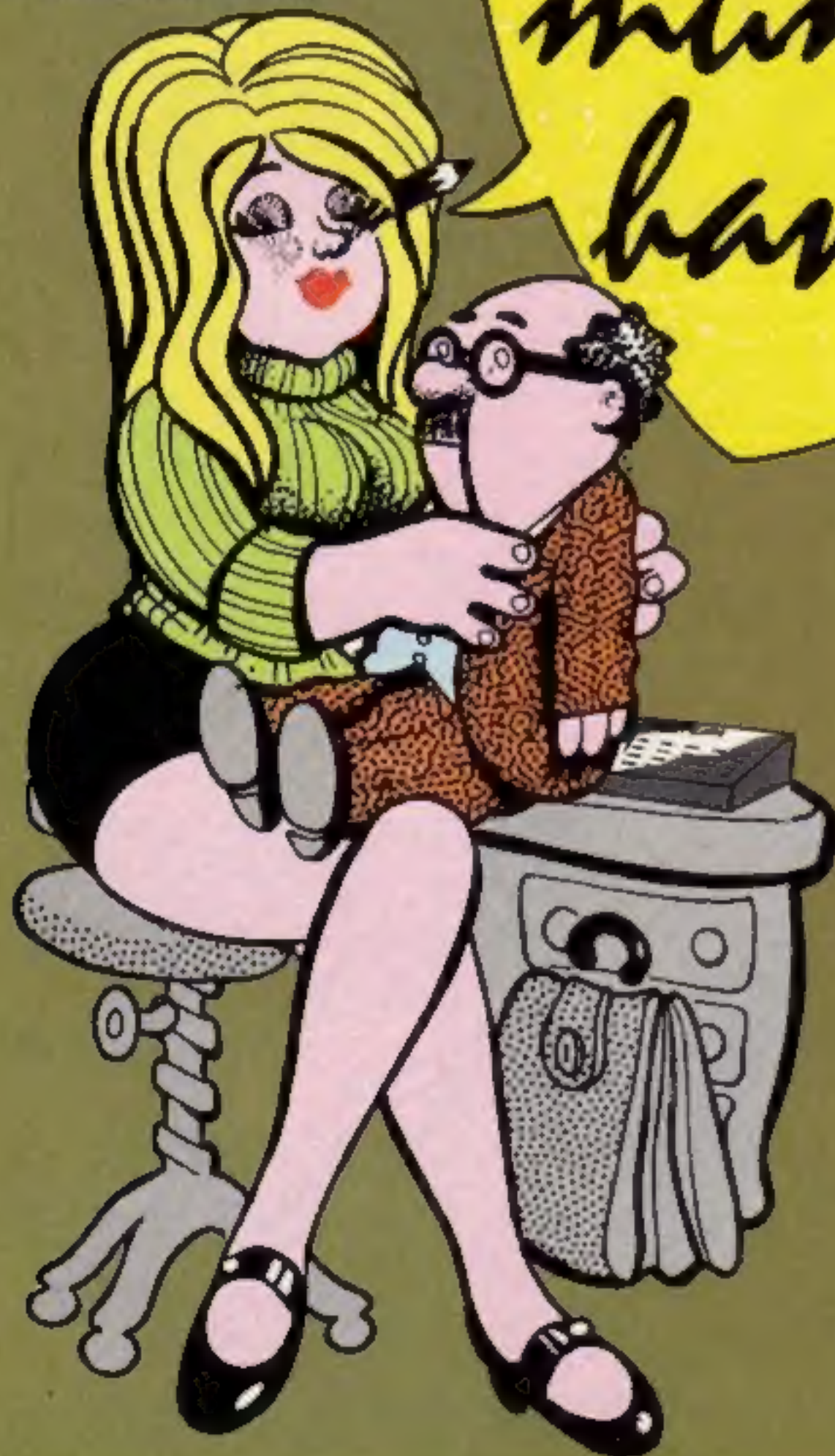
Such a program is ideal for people unfamiliar with the keyboard. It could serve as an introduction to the computer for young schoolchildren or computer illiterate adults. The system is already at use with disabled people.

One word of caution: don't speak for too long in either program, as your computer will rush on without you!

These programs may be one small step towards a future in which keyboards are redundant. Control of computers will be entirely by voice - what a boon for us lazy humans!

**Control your computer by throwing your voice. With these novel programs by Peter Sweasey you can play games without even touching the keyboard**

Look mum, no hands!



microphone is too sensitive it will pick up the tiniest vibrations (even the computer's own sounds) and if it isn't sensitive enough you will find yourself bellowing into it! If you use an external microphone don't hold it too close to the computer. And please note that not all tape recorders will work this way. Computer cassette recorders may well be the worst, and you may find you need to try several different models.

In order to test whether your tape recorder is suited and if you have the correct volume level, type in Listing one. Once RUN, the screen should remain blank yellow until a sound is found, when it will turn red and fire an arrow from left to right, before returning to yellow.

The major use of home computers is, perhaps unfortunately, for games. To demonstrate the capabilities of this system type in Hi-Lo, which could alternatively be called Say Your Cards Right! It's an adaptation of the well-known TV game show in which you are presented with four cards. At the top of the



• Listing 1 Hi-Lo

```

1 REM          Hi-Lo
2 REM By Peter Summey
3 FOR v=0 TO 7: READ a: FOR u=0 TO 7: READ b: DATA 13,24,34,17,15A,28,14
17
4 FOR v=0 TO 7: READ a: FOR u=0 TO 7: READ b: DATA 24,28,12B,27B,25B,12A,
19,24
5 LET h=1000: LET l=7000
10 BORDER ON PAPER 4: CLR
15 PRINT AT 0,0: PAPER 2: INK 7:
20 PRINT AT 0,12: PAPER 4: INK 0: FLASH 12: "LO"
25 INK 1: PAPER 7: PRINT AT 0,0: "
40 PRINT AT 0: FLASH 1: INK 2: "HI" : INK 1: FLASH 0: "
FLASH 1: INK 2: "LO" : FLASH 0: INK 1: "
45 PRINT "
50 FOR a=0 TO 7: PRINT AT 0,1: "
55 FOR a=0 TO 7: PRINT AT 0,0: PAPER 7: INK 4: "
60 NEXT a
67 PRINT AT 21,0: INK 0: "Money" : BANK 0: "1000"
68 FOR a=7 TO 10: PRINT AT 0,1: PAPER 7: INK 1: "
101
70 DIM s(4): LET s(0)=INT (RANDOM(1))
71 LET s(1)=INT (RANDOM(1)) IF s(1)=0 THEN GO TO 71
72 LET s(2)=INT (RANDOM(1)) IF s(2)=0 OR s(2)=1 THEN GO TO 72
73 LET s(3)=INT (RANDOM(1)) IF s(3)=0 OR s(3)=1 OR s(3)=2 THEN GO TO 73
100 FOR t=1 TO 4
101 GO SUB 9000
102 IF t=1 THEN GO TO 104
104 IF s(1)=0 AND s(2)=1 THEN PRINT AT 10,0: PAPER 4: INK 0: FLASH 12: "
1 Don't the card was higher" : BEEP .2,40: BEEP .2,20: BEEP .2,27: BEEP .4,40: B
EEP .4,40: LET h=h-a: LET l=l+b: GO SUB 9000: GO TO 100
105 IF s(1)=0 AND s(2)=0 THEN PRINT AT 10,0: PAPER 4: INK 0: FLASH 12: "
1 Don't the card was lower" : BEEP .2,40: BEEP .2,20: BEEP .2,27: BEEP .4,40:
BEEP .4,40: LET h=h-a: LET l=l+b: GO SUB 9000: GO TO 100
106 IF s(1)=1 AND s(2)=1 THEN PRINT AT 10,0: INK 1: FLASH 12: "
1 The
card was higher" : BEEP .5,0: BEEP .05,2: BEEP .2,0: BEEP .05,2: BEEP .05,0
: BEEP .5,1: BEEP .5,0: LET h=h-a: LET l=l+b: GO SUB 9000: GO TO 100
107 IF s(1)=1 AND s(2)=0 THEN PRINT AT 10,0: INK 1: FLASH 12: "
1 The
card was lower" : BEEP .2,0: BEEP .4,2: BEEP .5,1: BEEP .5,2: BEEP .4,1: B
EEP .5,0: LET h=h-a: LET l=l+b: GO SUB 9000: GO TO 100
108 BEEP .5,0: PRINT AT 21,0: INK 0: "Money" : BANK 0: "1000" : GO SUB
9000: IF t=4 THEN GO TO 150
109 FOR t=1 TO 70
110 PRINT AT 2,7: FLASH 1: PAPER 4: INK 1: "
111 IF IN 31000:255 AND NOT IN 31000:191 THEN FOR a=1 TO 4: BEEP .05,40: NE
XT a: LET h=h-a: GO TO 150
112 NEXT t
113 PRINT AT 2,7: "
114 GO TO 109
115 PRINT AT 2,7: "
116 GO SUB 9000: GO TO 200
117 IF IN 31000:255 AND NOT IN 31000:191 THEN FOR a=1 TO 4: BEEP .05,40: NE
XT a: LET h=h-a: GO TO 150
118 NEXT t
119 PRINT AT 2,7: "
120 GO TO 109
121 PRINT AT 2,17: "
122 FOR t=1 TO 70
123 PRINT AT 2,17: FLASH 1: PAPER 4: INK 1: "
124 IF IN 31000:255 AND NOT IN 31000:191 THEN FOR a=1 TO 4: BEEP .05,40: NE
XT a: LET h=h-a: GO TO 150
125 NEXT t
126 PRINT AT 2,17: "
127 GO TO 109
128 PRINT AT 2,7: "
129 GO SUB 9000: GO TO 200
130 IF IN 31000:255 AND NOT IN 31000:191 THEN FOR a=1 TO 4: BEEP .05,40: NE
XT a: LET h=h-a: GO TO 150
131 NEXT t
132 PRINT AT 2,17: "
133 GO TO 109
134 PRINT AT 2,7: "
135 GO SUB 9000: GO TO 200
136 IF IN 31000:255 AND NOT IN 31000:191 THEN FOR a=1 TO 4: BEEP .05,40: NE
XT a: LET h=h-a: GO TO 150
137 NEXT t
138 PRINT AT 2,17: "
139 GO TO 109
140 PRINT AT 2,7: "
141 GO SUB 9000: GO TO 200
142 IF IN 31000:255 AND NOT IN 31000:191 THEN FOR a=1 TO 4: BEEP .05,40: NE
XT a: LET h=h-a: GO TO 150
143 NEXT t
144 PRINT AT 2,17: "
145 GO TO 109
146 PRINT AT 2,7: "
147 GO SUB 9000: GO TO 200
148 IF IN 31000:255 AND NOT IN 31000:191 THEN FOR a=1 TO 4: BEEP .05,40: NE
XT a: LET h=h-a: GO TO 150
149 NEXT t
150 PRINT AT 10,0: INK 7: "Say Anything to continue..."
1500 IF IN 31000:255 AND NOT IN 31000:191 THEN GO TO 2000
1505 GO TO 2000
1510 PRINT AT 10,0: "
1515 STOP
1520 IF h=l THEN LET h=h+200
1525 GO TO 150
1530 PRINT AT 10,0: INK 7: "Say Anything to continue..."
1535 IF IN 31000:255 AND NOT IN 31000:191 THEN GO TO 2000
1540 GO TO 2000
1545 PRINT AT 10,0: "
1550 RETURN
1555 IF h=l THEN LET h=h+200
1560 GO TO 150
1565 PRINT AT 10,0: INK 7: "Say Anything to continue..."
1570 IF IN 31000:255 AND NOT IN 31000:191 THEN GO TO 2000
1575 GO TO 2000
1580 PRINT AT 10,0: "
1585 RETURN
1590 STOP
1595 IF t=1 THEN LET h=h+1
1600 IF t=2 THEN LET h=h+2
1605 IF t=3 THEN LET h=h+3
1610 IF t=4 THEN LET h=h+4
1615 FOR a=0 TO 14: PRINT AT a,0: PAPER 7: "
1620 PAPER 7: INK 0: IF s(1)=0 AND s(2)=1 THEN PRINT AT a,0: "
1625 IF s(1)=0 THEN PRINT AT a,0: "
1630 IF s(1)=1 THEN PRINT AT a,0: "
1635 IF s(1)=2 THEN PRINT AT a,0: "
1640 IF s(1)=3 THEN PRINT AT a,0: "
1645 IF s(1)=4 THEN PRINT AT a,0: "
1650 IF s(1)=5 THEN PRINT AT a,0: "
1655 IF s(1)=6 THEN PRINT AT a,0: "
1660 IF s(1)=7 THEN PRINT AT a,0: "
1665 IF s(1)=8 THEN PRINT AT a,0: "
1670 IF s(1)=9 THEN PRINT AT a,0: "
1675 IF s(1)=10 THEN PRINT AT a,0: "
1680 IF s(1)=11 THEN PRINT AT a,0: "
1685 IF s(1)=12 THEN PRINT AT a,0: "
1690 IF s(1)=13 THEN PRINT AT a,0: "
1695 IF s(1)=14 THEN PRINT AT a,0: "
1700 PAPER 4: RETURN

```

Hi-Lo  
How it works

- 3-4 UDGs
- 5 set up score variables
- 10-30 set up screen
- 35-50 draw Hi and Lo boxes
- 55-60 Print cards face down
- 70-73 work out values of four cards
- 100-108 check if player is still allowed to play
- 109-140 scan IN 31000 to see if player has spoken
- 150 finish main loop (F)
- 200 check to see if you have broken the bank, end game if you have
- 201 award bonus for correctly guessing four cards
- 205 start next sequence of four cards
- 3000-3010 pause routine, waiting for you to speak
- 900-9020 print card when

Hi-Lo  
Variables

- mo how much money you have
- ba amount of money in bank
- K(1-4) value of each of four cards
- hilo did you choose higher or lower? Set at 0 for lower, 1 for higher

Ka position horizontally on screen of card last dealt  
v,w,a,f,r,f, FOR...NEXT loops

Quiz

How it works

- 2-4 data for first none questions
- 5 data for last questions and screen positions of all 10 answers
- 10 DIMs variables
- 20 give value to all variables
- 30 set up screen
- 40 start main FOR...NEXT loop, print question and three possible answers
- 50-80 scan for voice at each
- 90 finish main FOR...NEXT loop, print final score
- 200-280 decide if answer is right or wrong, print appropriate responses

Quiz

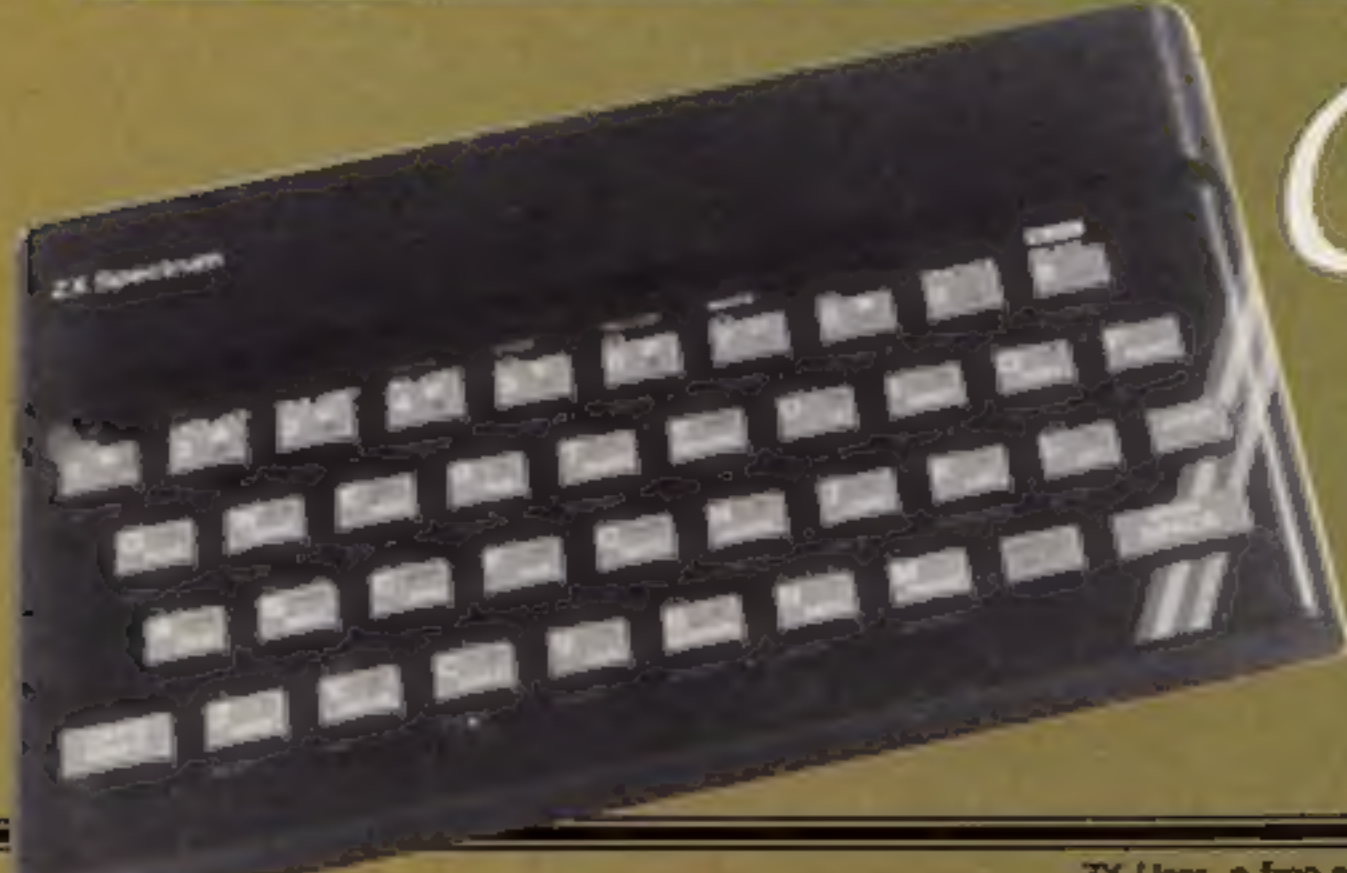
- q\$(10,61) questions
- a\$(10,29), b\$(10,29), c\$(10,29)
- h(10) screen position of all 10 correct answers
- a,b,c,d, FOR...NEXT loops

• Listing 2 Quiz

```

1 REM Quiz by Peter Summey
2 LET score=0: DATA "What is the smallest country in the world?", "Andorra"
3 DATA "Which city is the most famous?", "London"
4 DATA "What is the most famous river in the world?", "The Nile"
5 DATA "What is the most famous mountain in the world?", "Mount Everest"
6 DATA "What is the most famous city in the world?", "New York"
7 DATA "What is the most famous city in the world?", "London"
8 DATA "What is the most famous city in the world?", "Paris"
9 DATA "What is the most famous city in the world?", "Tokyo"
10 DATA "What is the most famous city in the world?", "Sydney"
11 DATA "What is the most famous city in the world?", "Melbourne"
12 DATA "What is the most famous city in the world?", "Auckland"
13 DATA "What is the most famous city in the world?", "Wellington"
14 DATA "What is the most famous city in the world?", "Christchurch"
15 DATA "What is the most famous city in the world?", "Dunedin"
16 DATA "What is the most famous city in the world?", "Invercargill"
17 DATA "What is the most famous city in the world?", "Queenstown"
18 DATA "What is the most famous city in the world?", "Timaru"
19 DATA "What is the most famous city in the world?", "Napier"
20 DATA "What is the most famous city in the world?", "Hastings"
21 DATA "What is the most famous city in the world?", "Tairāhema"
22 DATA "What is the most famous city in the world?", "Rotorua"
23 DATA "What is the most famous city in the world?", "Whakatane"
24 DATA "What is the most famous city in the world?", "Whangarei"
25 DATA "What is the most famous city in the world?", "Whanganui"
26 DATA "What is the most famous city in the world?", "Whararapa"
27 DATA "What is the most famous city in the world?", "Wairarapa"
28 DATA "What is the most famous city in the world?", "Wellington"
29 DATA "What is the most famous city in the world?", "Auckland"
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Control your Spectrum





**Worse Things Happen at Sea**  
48K £5.95

Silversoft, London Hse, 271-273 King St, London W6 9LZ

You're a robot, frantically trying to keep a rusty ship afloat. Each compartment has a pump and one patch, may spring several leaks and pump handles are in short supply. Standing in water saps energy and can kill; you can only recharge in compartment one and you have three lives. I'm still on my second crossing but gather you have to steer the ship while cooling the engines.

Water level, course, engine temperature and energy charge are displayed top-screen, plus animation of the ship sailing between two cliffs and a floor plan, showing your position and the water rising. Scoring: cargo value minus spoilage, repairs and replacement robots.

Super graphics, good sound. This game inspires panic and is physically exhausting. It needs a cool head and cunning rather than fast fingers. Very addictive. No inlay instructions were supplied with pre-production tape but they are necessary because on-screen ones are cryptic. It finally dawned on me there were other doors apart from the obvious ones.

This is the best game I've seen for ages. D.C.

instructions	60%
playability	30%
graphics	90%
value for money	90%

★ ★ ★ ★

**Front Loop**  
48K £3

NTD Software, PO Box 543, London SW6 5DS

The screen displays a number of compartments, each containing apples. Fighting a time limit, you have to collect all the apples before moving to the next screen. The apples sometimes turn rotten and you must find a blue banana to restore them.

On later levels, some compartments have no entrances and blasting in penalises your time allowance. Guards appear in increasing numbers, and contact with them, rotten apples or blue squares loses one of five lives. Press the panic button to freeze guards -- but pay the penalty. There are 10 screens, six skill levels, and you can use keyboard or joystick.

Graphics aren't great -- both you and the guards are bodyless forward-facing heads. Inlay instructions are clear, which is useful because on-screen instructions take no for an answer without any keypress. The game doesn't crash but plays improperly with Microdrive attached. The panic button seems to move guards elsewhere rather than freeze them and it's unfair that they materialise at your start point.

I found the game amusing but suspect 60 screens of apples may produce colic. D.C.

instructions	80%
playability	60%
graphics	55%
value for money	90%

★ ★ ★

**Empires**  
48K £19.95

Imperial Software, Imperial Hse, 153, Churchill Rd, Poole, Dorset

This is a three-player strategy game in which feature a human, reptile and robot. You must dispatch scouts, mine planets, build cargo and military ships, ally or fight other races. Your aim is to rule the galaxy. The package contains umpire tape, three individual player tapes, four instruction sets, four galaxy grid maps and data cards.

Each galactic year, players enter moves on their programs,

saving and sending data to the umpire, who processes and returns updated data for next move. Excellent text and graphics although human blue gives difficulty.

An absorbing game which I yearn to play, but the loading time is seven minutes. The program news at the end of each move and sometimes on loading, forces another seven-minute wait. D.C.

instructions	90%
ease of use	50%
display	90%
value for money	75%

★ ★ ★ ★

**Sabre Wulf**  
£9.95

Ultimate Play the Game, The Green, Ashby de la Zouch, Leics LE6 5JU

When a firm like Ultimate Play the Game is quiet for a while something is in the wind. The ads excite interest by simply giving the name and price of the game.

Sabre Wulf is very similar to Atic Atac but more playable and makes better use of colour. Previous Ultimate games had virtually no instructions: this comes in a larger than average box with a glossy sheet explaining a little in riddle form.

You are an intrepid explorer lost in a jungle. Your task (I think) is to find the four sections of a talisman and defeat the wulf. The game has arcade and

adventure elements. You kill spiders, snakes and other nasties using a sword. You chase and are chased by rhinos and wildebeest. The adventure is in mapping the jungle (a job for two) and finding out the effect on you of secretions from local fauna. Yellow flowers stun you, red make you invincible, purple reverse your movements and so on. These effects are not permanent.

The action is fast, smooth and detailed to a cartoon standard. The price reflects demand and the work involved. This is a must for all Spectrum games players.

instructions	100%
playability	100%
graphics	100%
value for money	100%

★ ★ ★ ★ ★

**Crazy Crane**  
£5.50

Voyager Software, Unit 31, Wirral Business Centre, Corsey Lane, Birkenhead, Merseyside

The scene is a harbour in shark-invested waters. You are a computerised magnetic crane on the pier, a short distance from the harbour wall. Ships appear from behind the wall and pass the pier. Before they reach you, you must extend your magnetic grab, lift off their cargo and land it safely on the pier. If missed, the cargo falls into the water at the pier, losing one of three lives. Unload five lots of cargo and you reach the next level. The cargo alternates between helicopters, containers, animal cages and aliens. Ships come fast and furious, sometimes in pairs.

After level four, missiles

attack. What happens thereafter is a mystery to me. Your score is based on cargo unloaded plus 100 times level bonus and presumably number of levels is limited only by ability to survive. Control is by keyboard and Kempston-type joystick.

Good graphics, but Microdrives are not new so there's no excuse for program-crash because they are attached. Crazy Crane required intense concentration and fast fingers. One for the 'my score is highest' brigade. I might tire of lack of variety in screen and cargo after a while but it's enjoyable for now. D.C.

instructions	90%
playability	75%
graphics	85%
value for money	90%

★ ★ ★ ★

